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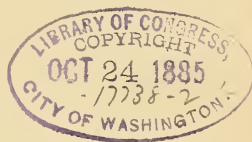


# Epithelioma of the Mouth.

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NEW YORK:  
A. L. CHATTERTON COMPANY.

1885.





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MARTIN & NIPER,  
*Printers, Electrotypers and Binders,*  
218 Fulton St., Brooklyn, N. Y.



## PREFACE.

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The following monograph is the out growth of a series of investigations, entered into in the course of professional study, for the purpose of elucidating to the author, some obscure points in the pathology, ethiology, and treatment of epithelioma of the mouth. Originally designed for personal use only, the notes made, early assumed the character of a study of the subject, which, in accordance with urgent requests, is now presented to the profession.

H. I. OSTROM.

139 West 45th St., July, 1885.

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## CHAPTER I.

### THE EPITHELIUM OF THE MOUTH.

For our present purpose it is convenient to study the epithelium of the mouth.

This will be found to include the lining of the buccal cavity, the covering of the tongue, and the essential part of all the glands that pour their secretions in front of the pharynx.

Before the fourth week in the life of the human embryo, there is developed at the lower part of the face a broad, transverse cleft. This is the primitive mouth, (*stomodocum*), and while the initial step in its development is a growth inwards of that part of the face which corresponds to the embryonic depression, the future enlargement of the buccal cavity depends more upon the growth outwards of the fronto nasal process in the middle, the superior maxillary processes on the sides, and the mandibular plates, which are continuous with the maxillary processes, than upon the extension inwards, the deepening of the primitive cleft.

Developed as it is from the face, and carrying with it the covering of the face, the investing membrane of the mouth is derived from the epiblastic layer of the blastoderm. This depression of the epiblast, the future mouth, forms a sac, that is at first closed posteriorly, having only an anterior opening between the processes above mentioned. Not until the eighth or ninth week is a communication established between the mouth and the pharynx—the latter is of mesoblastic origin—by breaking down the anterior wall of one cavity, and the posterior wall of the other.

It is thus seen, that the mouth and the pharynx are in the embryo, two separate non-connecting cavities, the first having its origin in the epiblastic layer, the second in the hypoblastic layer, and visural mesoblast.

This embryonic differentiation suggests the possibility of a corresponding distinction being made between the future functions, of these two divisions of the alimentary canal; but also, and especially because of its bearing upon the etiology of the diseases of the mouth, of establishing a relation between the blastodermic layer represented, and the

form of disease that it develops. It must be confessed, however, that this anticipation has thus far been only partially realized ; for while the differentiation of the embryo into layers, and the development of these layers into organs and parts with an unchanging regularity and exactness, has been demonstrated, it cannot at present be shown that, for example, the glands of the mouth, and the glands of the pharynx, may not develop exactly similar diseases, and present indistinguishable histological conditions.

The usual method of the development of glands—by a prolongation inwards of the epithelial layer upon which the secreting organ is to open,—renders it probable that the mouth, whatever may be its mature conformation, when viewed in its simplest form, presents a continuous layer of tissue, without depressions or elevations ; and that the variously formed recesses that constitute the salivary and mucous glands, are a later development, to meet the requirements of the growing organism.

This anatomical distinction, which marks the functionally active mouth, forms two convenient divisions for studying the buccal



epithelium,—the non-glandular, and the glandular tissue; but let it be emphasized that they have the same genesis, and that their histological distinctions are the result of functional requirements.

The features by which epithelial tissue is recognized, are few, but well marked. The cells though variously shaped are nucleated, and everywhere in close apposition, or are held together by a cohesive substance that is not always apparent. They are arranged on a base of connective tissue—the *membrana propria*, or in the case of glands, the *stroma*—in the form of one or more layers, in which there is no vascular system, but in which the supply of nerves is sometimes quite abundant. These layers of epithelial cells constantly cover the surface of the body, and those canals and cavities that communicate with the surface. They may, therefore, be looked upon as defining the body, as constituting a natural boundary to the organism, and as everywhere presenting a surface upon which contact with external objects is effected.

The definiteness with which epithelial tissue, as distinguished from the bodies that

enter into its construction, is recognized, is not found to be equally true of the individual epithelial cells, for these, when isolated, are not always clearly characteristic ; and especially when young and immature, before they have assumed either the form or function of a special variety, are not distinguishable from other cells while in a transition state, or from other varieties of epiblastic derivatives. A reason for this exists in the fact that epithelial cells are not permanent bodies. With peculiar rapidity, they pass through their different stages of evolution, and do not accomplish their physiological perfection until immediately before they are destroyed, or thrown off. Hence, it is apparent that as one variety of epithelium can pass into any other variety, if the conditions and requirements are favorable for such a metamorphosis, it is impossible to predict the form that the young cell may assume.

Functionally active epithelial cells are not provided with a cell wall, but are composed of protoplasm in the form of a fine reticulum, in the meshes of which is found the peculiar cell contents. The nucleus and

nucleoli are also composed of a reticulum, that is apparently continuous with that of the cell body, but the nucleus is constantly surrounded by a double contoured limiting membrane. Such naked bodies are young cells, of which the outer zone of protoplasm has not hardened into "formed material," to give a protective envelope.

The contents of epithelial cells will be found to vary with their function, and the period of functional activity at which they are examined, for all epithelial cells are secreting bodies, the nucleus probably possessing an elective power over the substance secreted and elaborated.

The non-glandular, or investing epithelium of the mouth, which is directly continuous with the epithelial covering of the face, belongs to the stratified pavement variety. It is composed of several layers of differently shaped cells, the deeper or attached layer being generally columnar, while the superficial layer presents flattened scales, that slightly overlap each other, and are not always provided with nuclei. Between these layers may be distinguished an intermediate layer of polygonal cells, having blunt angles.

The regeneration of epithelium, a regeneration made necessary by the constant desquamation of the cells of the superficial layer, always takes place from the deeper layer, the cells of which do not lie in immediate contact with each other, but are united by means of spines and ridges—probably the continuation of the reticulum of the cell body—which, projecting from the surface of one cell, are received in corresponding depressions, or upon similar spines of other cells, by which means are formed intercellular channels.

These tubes probably constitute a vascular system, that of necessity changes with the multiplication of the cells, and have no other walls than the limitations of the epithelial cells. It is not unlikely that nerves also occupy these channels.

Below the columnar epithelial cells, and resting upon a layer of loose connective tissue that serves to unite the buccal mucous membrane to the underlying parts, is the corium, a structure made up of connective tissue fasciculi and elastic fibres, which give rise to papillæ, the whole of especial interest in the present study, as being the tissue that

contains and supports the numerous mucous glands found in this region.

The epithelial covering of the tongue and soft palate differs somewhat from the stratified epithelium found on the cheeks, lips and hard palate. It accurately invests the papillæ of the tongue, and the taste buds, dipping down between these; and over the circumvallate papillæ at the base of the organ becomes very thick, entirely concealing the minute secondary papillæ, that are developed from the apex of some of the conical papillæ.

The epithelial covering of the secondary papillæ is characteristic. Over these elevations the epithelium is arranged as a separate horny layer, prolonged into processes that extend far beyond the papillæ that it covers. From this circumstance these papillæ have been called filiform.

The epithelial cells of the filiform papillæ are usually more or less hard, containing only a small proportion of protoplasm, and frequently no nucleus. As with other epithelial cells, they are constantly being thrown off, and their place supplied from the deeper layers.

The larger portion of the soft palate is

covered with scaly and stratified epithelium, that presents no marked differences from the investment of other parts of the mouth ; but at the upper portion the epithelium is ciliated, and in places columnar.

In common with other mucous membranes, that which lines the cavity of the mouth is constantly bathed with mucous. This secretion is accomplished either by the investing epithelial cells, which elaborate mucine within their protoplasm, and discharge it, probably at the same time, and with the cell body either intact or destroyed ; or by minute glands situated within the sub-mucosa.

In reference to the first method, it is to be noted that the columnar cells are especially concerned with the formation of mucous. These cells often become so much distended with mucigen that they lose their columnar shape and assume the chalice or goblet form, by bulging near the free border. At the same time the nucleus is found pressed against the inner and attached part of the cell. From the distended part of the cell, when this does not burst, a drop of mucous may frequently be seen to exude, which increases the peculiar form of the cell. The

scaly or stratified cells do not, to any extent, secrete mucous; and these occupying the most superficial layer of the membrane, it is probable that the deeper epithelium of the mouth, though columnar, is more especially for the purpose of regenerating the outermost layer of cells, and of less service in secreting mucous; it is not, however, denied that, under certain circumstances, they may perform this office.

It thus appears that the buccal mucous is almost exclusively of glandular manufacture, and is to a limited degree only, elaborated by the investing epithelium.

A description of the epithelium of the buccal mucous glands would, in a great measure, be a repetition of what has been already said concerning the epithelial investment of the mouth. For, as we have seen, to a certain but varying degree, all mucous epithelium is glandular, that is to say, it performs the function of secretion.

The mucous glands of the mouth are minute, compound acinous organs—similar to the salivary glands—that are formed by a prolongation of the investing epithelium, into the sub-mucosa. They are lined with

columnar cells, which when active, assume the chalice shape referred to.

The glands are situated on the inner side of the lips, principally the lower, on the cheeks, on the hard and soft palate, beneath the lymph follicles at the base of the tongue, and behind the lingual V near the papillæ vallata and foramen cæcum. On the inferior surface of the tip of the tongue, the glands form two elongated patches—the glands of Blandin and Nuhn—the ducts of which open on each side of the *fraenum linguae*.

The ducts of the buccal mucous glands are usually very short, and are lined with columnar epithelium; the gland itself is filled, rather than lined, with the same variety of cells.

The other glands of the mouth, in the function and construction of which epithelial cells bear a principal part, are the salivary glands. These are arranged in three pairs, only two pairs of which are situated in the mouth, but the parotid glands are included among the buccal glands, because their function does not differ essentially from the other salivary glands, and, also, because their secretion is poured into the month, together



with that from the sub-maxillary and lingual glands.

The salivary glands belong to the group of acinous glands, and in every instance consist of a variously branched tube, lined with epithelium. The alveoli or terminal branches, are lined with large tessellated epithelium, and the other part of the tube with columnar epithelium. These salivary tubes pass in different directions within the interior of the gland, and perform an important part of the process of secretion. They are not to be confounded with the excretory duct of the gland, the office of which is probably largely mechanical in assisting the flow of the saliva from the gland. The salivary tubes are not possessed of muscular fibres.

In the alveoli of the sub-maxillary and sub-lingual glands are found two species of epithelial cells. Mucous cells, which are large and pyramidal, with their apex towards the centre of the alveolus, and their nucleus almost in contact with the basement membrane; and small, granular, irregular cells, united in groups, in the form of crescents, that are usually situated at the base of the alveolus, when their convexity is against the

basement membrane, and their concavity is occupied by the mucous cells; sometimes these crescents are found in the centre of the alveolus, between two mucous cells.

These cells contain a serous albuminous fluid, which, mingling with the mucine of the mucous cells, constitutes saliva. The paroted gland contains only serous albuminoid cells, the mucous cells being conspicuously absent from this salivary organ.

The essential elements in the secretion of saliva are, as in all glands, the epithelial cells; but from the fact that healthy saliva contains no morphological elements, it may be asserted that neither the mucous nor the serous cells of the salivary glands contribute more than their contents to the formation of saliva. It is not probable that physiologically the cells of these glands are destroyed in the process of secreting saliva, but rather, that they elaborate their peculiar contents, and then enter into a state that favors the discharge of this elaboration, without the disintegration of the cell body.

The regeneration of salivary glandular epithelium is a less active process, than the regeneration of the epithelial cells

that form a part of the secretion of other glands, is known to be. In health, therefore, the morphology of the salivary cells is more accurately described as a multiplication than as a regeneration, the latter term conveying an impression of cellular loss that does not belong to the secretion of saliva. This fact has an important bearing upon the etiology of epithelioma, and will be discussed in its appropriate place.

The multiplication of salivary cells probably takes place through almost the entire length of the salivary tubes, and the alveoli of the acinous gland. The process is believed to be associated with the varicose fibrils of the columnar cells that lie in contact with the *membrana propria*, into which they project, and form alveolar like groups. At least in some instances, the proliferation of salivary epithelium, is accomplished independently of the nucleus of the columnar cells, for the nucleus that appears in the new cell seems to originate in the cell itself, by a process of free cell formation, and not by a division of the nucleus of the previously existing morphological element.

Passing in review this brief description

of epithelium, and of epithelium of the mouth, we find that epithelial cells, especially those that invest the mucous membranes, perform the function of secretion, and that the arrangement of these cells into alveoli, is not for the purpose of changing their function, but to facilitate and increase their powers of functional activity.

It has further been observed that the life cycle of epithelial cells is quickly completed, and ends with the casting off of the cell from the surface upon which it is developed; that in many instances, though probably not forming an essential part of secretion, the cell, either as a broken down body, or with its unity undisturbed, is a constant element in the secreted fluid; its presence, however, is frequently indicative of a pathological state.

It has also been observed that the epithelial cells of the salivary glands are capable of undergoing a process of free cell formation; that the nucleus, which is generally credited with a controlling influence over cell division, is in this instance, powerless to impart to the progeny of the columnar cell, the physiological function, for which it, the cell, exists; and that, therefore, though the cells so formed

may follow a perfectly normal course, their genesis renders it possible for them to do otherwise.





## CHAPTER II.

### EPITHELIOMA OF THE MOUTH.

It is characteristic of epithelial neoplasms wherever developed, that they resemble in the arrangement of their component parts—connective tissue and epithelial cells—to a greater or less degree, glandular tissue. This likeness may in some instances, for example in adenoma, be so striking as to give the impression of a duplicate gland ; and in other instances, for example in carcinoma, so remote as to present, only in isolated parts, the general features of secreting tissue—a vascular basement membrane of connection tissue, upon which is spread an investment of non-vascular epithelial tissue.

To epithelial neoplasms, and by this is understood epithelial tissue that is abnormal in genesis, arrangement and function, may be attributed a clinical history of the most marked malignancy ; a malignancy that seems to be in inverse ratio to the resemblance that the new growth bears to glandular tissue.

In seeking the cause of this incompat

ibility with the life of an organism, it is not satisfactory to attribute the entire sum of malignancy to the simple multiplication of epithelial cells, either as a primary growth, or as a secondary deposit ; neither can so much virulence be made to depend upon the dissemination through the system of a hypothetical poison that is manufactured in a particular cell area—the epithelial neoplasm. But if to this variety of the tumor disease, we apply the principles of rational pathology ; of a pathology that has its genesis in physiology, and that finds in normal operations, the prototype of abnormal operations, though still having much to explain, we establish our investigations upon ascertained laws, and will learn that as all vital phenomena are related, and because in every instance health must proceed disease, life antedate death, the malignancy that accompanies a particular histogenesis, is the result, either of an increase or a decrease of the function of the part or tissue effected, and not dependent upon a super-added vital process.

An examination of the function of epithelial cells, furnishes an insight



into at least one of the causes of their marked malignancy when their function is perverted. Thus, the office of epithelial cells, especially the columnar investing epithelium of the mucous membrane, and of the secreting glands, is to extract from the blood a peculiar pabulum.

In certain proportions this pabulum is physiological in the blood, but if it falls below, or rises above the limits of a normal quantity, it is evident that we have to deal with a more or less pernicious alteration of the nutrient fluid. Now if by the numerical increase of epithelial cells—a constant condition of the growth of epithelioma—the functional activity of that particular cell area is augmented, either the blood is deprived of some of its constituents, or some manufacturing organ is called upon to maintain its normal standard. Is there not in this found an explanation of the cachexy that follows the development of epithelioma; of the malnutrition, and wasting of tissues that do not appear until the epithelial cells, the gland cells, have multiplied beyond their normal number ; until the function of secondarily effected glands, as when the lymphatics

become implicated, is so altered as to convert the lymphatic gland into one that resembles the organ primarily diseased.

But this is not the only effect of the multiplication of epithelial cells, for it becomes evident that these cells, while they appropriate more pabulum than should be removed from the blood, are also capable, by virtue of their glandular endowment, of originating an entirely new and abnormal secreting function, the performance of which not only represents a process of removing from the blood elements that form a part of its normal composition, but also a manufacturing process, by which the elements secreted by the abnormal glands cells, are by them elaborated and returned to the system in a condition, harmful, if not poisonous. In this sense a neoplasm may be said to owe its malignancy to a peculiar poison, but the possibility of such a poison is one of the closing features of a series of phenomena, that if they are not sufficient to cause the destruction of the organism, certainly reduce vitality to such a degree, as to render the system unable to resist even slightly adverse conditions.

Epithelioma of the mouth has its origin in the epithelial cells, either of the mucous membrane, the mucous glands, or the salivary glands.

Two distinct initial processes are observed in the development of epithelioma of the oral mucous membrane. The more highly malignant form, first appears in the substance of the investing membrane, as a nodule of epithelial cells. From the centre of this nodule the ulceration proceeds outwards, the more superficial layers of tissue being gradually involved in the process of destruction. The extension of the nodular variety of epithelioma is not confined to the superficial tissues, but is essentially an infiltrating growth that involves contiguous structures.

From the primary nodule, processes composed of the same epithelial cells, project into the sub-mucosa, until finally this structure is occupied in every direction by the same carcinomatous mass. The neoplasm is further enlarged by separate nodules uniting. These deeper parts may join in the ulceration process, and then give rise to excavations in the centre of the epithelioma, from which may sometimes be pressed a yellowish,

cheesy mass, composed of broken down epithelial cells, and cells that have passed into a state of fatty degeneration.

All of the carcinomatous tissue is not included in the destructive process of ulceration, but there constantly exists a shell of epithelial cells, hard and closely packed, more or less supported upon a stroma of connective tissue, which forms the indurated base so characteristic of epithelioma. The stroma upon which the outer zone of carcinoma cells rests, and that supports the collections of epithelial cells that occupy the parenchyma of the neoplasm, is sometimes embryonic, partaking of a sarcomatous character. Such a mixed histology marks a superlative degree of malignancy.

The ulceration of an epithelioma shows no disposition to develop cicatricial tissue, even though a temporary scab is formed. Neither is there observed the contraction that constitutes a feature of other ulcerations, the entire process is one of the destruction of existing tissues, without reconstruction; of the substitution of erratic for normal morphology.

The other and more benign variety of epithelioma of the mucous membrane of the

mouth, begins on the surface of the epithelial layer, as a crack, or at first, as a simple abrasion, that later ulcerates, the ulceration extending superficially and never involving the deeper structures. Sometimes a small soft wart, is the first lesion observed ; but probably that condition is generally, if not always, preceded by a slight fissure, the irritation of which is sufficient to cause such a proliferation of epithelial cells, as would form a condyloma.

The initial lesion, from its apparent insignificance, is easily overlooked by both patient and surgeon.

Excepting for the depth of tissue involved, the two varieties of mucous epithelioma of the mouth are with difficulty distinguished, after ulceration has become well developed. There is the same zone of induration surrounding both processes ; the same spreading ulcer ; the same healthy tissue beyond the sharply defined, hardened border, and the same enlargement of the lymphatic and salivary glands. The diagnosis will rest principally on the early history of the case, and on the degree of rapidity with which it reaches a fatal termination.

Any of the minute tubular glands of the mucous membrane of the mouth may be the seat of epithelioma, and it seems probable, that occasionally the nodular variety of mucous epithelioma arises in these structures.

By a process of proliferation, the secreting cells soon occupy the interior of the gland and its excretory duct, converting the organ into a solid mass of epithelial cells. The morbid process being communicated to the superficial epithelium by means of the opening of the gland, or a "catalytic action" taking place, ulceration follows as in the nodular variety of mucous epithelioma. Epithelioma of the mucous glands possesses marked malignancy ; and it is apparent that the situation of the invaded organ, in the loose connective tissue, offers peculiar advantages for the infiltration of contiguous structures.

Epithelioma of the salivary glands begins as a proliferation of the columnar epithelium of an isolated nodule. Other parts of the gland are soon involved, and the process spreading outwards, both deep and superficial ulceration supervenes. The process of destruction, however, generally belongs to the later stages of the disease.

The tumor is at no time well defined from the connective tissue in which the salivary gland lies ; and the stroma of the neoplasm becomes either embryonic, or, from inflammation excited by the epithelial cells, entirely disappears, as the neoplastic process progresses.

It is, therefore, not unusual for epithelioma of the salivary glands to present a mixed histology. The connective tissue stroma may be replaced by sarcomatous tissue, which becomes incorporated into the tumor, forming a net-work between the groups of epithelial cells. As with the epithelioma of the mucous glands that show this mixed minute anatomy, the salivary epitheliomata are highly malignant.

It is also observed, agreeable to the two sets of cells found in the salivary glands, that mucoid elements may be mingled with the characteristic epithelial cells of the neoplasm. This arrangement has not been seen in epithelioma of the parotid gland, because of the absence of mucoid cells from that organ.

The minute anatomy of epithelioma of the mouth, shows in every direction, the distin-

guishing features of pavement epithelioma generally.

To the naked eye the tumor presents a grey or rose tinted appearance. On section, the mass is found to be of unequal consistence, and to be made up of dense collections of epithelial cells, arranged in concentric layers that resemble the leaves of an onion. Between these bird-nest bodies a less dense connective tissue stroma lies, that may exhibit in different parts almost any degree of development. In this stroma, the arteries, veins and capillaries pass, but are never continued into the epithelial tissue.

It will thus be seen that there is little in the individual cells of epithelioma when isolated, to determine the nature of their genesis. Normal epithelial cells, when functionally active, or when subjected to pressure, assume various shapes : it is, therefore, the arrangement of these elements that must be looked upon as bearing a principal part in the neoplasm ; and their relation to the connective tissue, that anatomically distinguishes epithelial, from connective tissue neoplasms.

If the section of the abnormally proliferat-



ing epithelium is made to extend through the matrix of the growth, it will be found that there is no absolute dividing line between the tissues, save in their arrangement, and that this peculiar arrangement of epithelial and connective tissue, becomes less marked towards the periphery of the mass, passing by imperceptible gradation, into healthy tissue.

The absence of a limiting membrane to epithelial neoplasms, is the chief cause of their invasion of neighboring structures, and of the infection of lymphatic glands.

Though, as we have seen, any part of the epithelial lining of the mouth may become the starting point of epithelioma, this neoplastic disease shows a preference for certain locations, to the almost entire exclusion of others.

As a primary disease, epithelioma of the mouth is rarely developed in other locations than the lips, the gums, the salivary glands, the tongue, and the palate. The tonsils, the cheeks, and the floor of the mouth, are generally attacked secondarily, or by direct continuity of tissue.

The reasons for the immunity enjoyed by

some parts of the mouth, and the susceptibility shown by others, is not always discoverable. If we receive mechanical or chemical injuries as etiological factors, and we certainly are not justified in excluding either, there is found a class of exciting causes of epithelioma of the lips, gums, and anterior part of the tongue ; but the entire mouth is subject to much the same kind and degree of trauma, with the different results named ; there must, therefore, be other etiological factors, that either alone or in conjunction with traumatic causes, are powerful to excite a local neoplastic process. I am inclined to believe that the principal factor in the etiology of epithelioma of the mouth, will be found to relate to the peculiar kind and degree of functional activity of the minute mucous glands situated in the region affected. The theory that epithelioma owes its origin to a perverted glandular function—not necessarily of a secreting organ, but generally so, because there the glandular function is intensified—has elsewhere been referred to, and there is no reason for excluding the present variety of epithelioma from that hypothesis.

The labial glands, for example, are much more abundant in the lower than in the upper lip, and are generally entirely absent from the angles of the mouth. Now it is exactly where the labial glands are the most plentifully developed, at the junction of the mucous membrane with the skin, and on the free border of the lower lip between the median line and the angle of the mouth, that epithelioma of the lip is usually developed. I do not remember to have seen any cases reported in which the neoplastic process began in the angle of the lips, nor have I met with such examples in my own practice. In the upper lip epithelioma is so rare, that its existence has been denied.

The lingual glands are distributed at the root of the tongue, on the sides and at its apex, and it is in these situations that epithelioma is most frequently developed. The same relation is found between epithelioma and the glands of the palate and uvula; in the latter part the mucous glands are very large.

An exception to the glandular origin of oral epithelioma may seem to exist, when this neoplasm is developed from the gums;

but upon investigation, we find that columnar epithelial cells are largely concerned in the construction of the investing epithelium of the gums and alveoli, and we have already observed that columnar cells are in a peculiar manner capable of assuming the function of mucous glands.

While, therefore, columnar epithelial cells form a part of the oral mucous membrane generally, it is probable that the etiological factor of mechanical irritation, enters with force in the localization in the gums, of epithelioma. For here irritation is very likely to arise from a decayed or ragged tooth, and from the presence between and around the teeth of decomposed food, or to follow the attempt to remove such collections of effete matter.

It is possible that derangement of the digestive organs may exert some influence over the development of oral epithelioma, though the degree of this influence cannot be told. Cases however occur, in which chronic gastritis and dyspepsia precede the development of epithelioma of the mouth. If these circumstances stand in the relation of cause and effect to each other, it is prob-

able that the oral epithelium is excited, or possibly only irritated—the initial lesion—by the long-continued acid of effete matter or other risings from the stomach.

The clinical history of epithelioma shows the development of this neoplasm to be associated with the period of physical decay; to the time of life when the organism as a unit, and in its individual parts, is beginning to disintegrate, beginning to offer less resistance to its environment, and to enter upon that process of equilibration, that in its perfection results in dissolution, and the re-establishment of organisms.

I have elsewhere (*A Treatise on the Breast and its Surgical Diseases*) referred to the probable connection between the upfolding of the mammary glandular function, and the development of epithelioma; the same relation probably exists between the involution of all epithelial structures and their pathology.

The mammary gland being physiologically subject to oft repeated periods of evolution and involution, may naturally be expected to illustrate this hypothesis in a marked degree; but the transitory nature of epithe-

lium generally, at once suggests that a similar relation may obtain between epithelial neoplasms wherever developed, and the metamorphoses that accompany the natural death and desquamation of all epithelial bodies.

It is thus shown to be the age of the individual unit rather than the aggregation of units—unless these bear a definite relation to each other—that determines the development of epithelioma generally, and therefore, of the mouth. It is however true, that physiologically, all secreting organs, even those that, unlike the mammary gland and ovaries are not subject to a final complete involution, become less active with advancing years; and that the secreting cells—the epithelial cells—pass into a condition of fatty degeneration and vacuolation during the process of upfolding, and as their function becomes less vigorous.

The glands that enter actively into the process of digestion, are notably effected by the senile period. The salivary glands become less active, and may continue at a very low degree of functional activity for a length of time; this same imperfect glandular operation, is prolific of neoplastic processes, par-

ticularly of epithelioma. Many of the gland cells become at the folding up process, or low degree of functional activity, waste cells, bodies intended to be thrown off from the system, but if these are not removed from the gland, a circumstance that frequently occurs, being endowed with epithelial powers of regeneration, perverted, however, they form a center for pathological cell proliferation. In this sense, epithelioma of the mouth, is a disease of declining years, because to declining years belong certain histological changes that *per se* favor the development of this neoplastic disease.

But it is evident, that no period can be named, during which epithelioma must develop; for individuals differ, as much in the rapidity with which they pass through their several stages toward maturity, and then reverse the process, as they do in physiognomy, or mental qualities; and while it is still true that epithelioma is a disease of decay one organism may mature, be maintained, and decline, in a much shorter period than is consumed by another organism. I am therefore inclined to regard the development of epithelioma in adolescence, as indicating a

premature general or local decay ; a folding up of some process, before its natural time of involution.

With a better understanding of the genesis, histology, and chemical history of epithelioma, it becomes more evident that the disease in its first stages, is a purely local disorder, and not, as formerly believed, and still held by a few eminent surgeons, the out-growth of a constitutional state.

As a proof of the local origin of epithelioma, it is only necessary to remember that the neoplasm appears,—is indeed, usually discovered quite by accident—, in persons who enjoy excellent health. Before the neoplasm is observed, there are no indications of the approach of the future disease, and it is not until after the development of the local malady, and the development of secondary neoplasms, that the system suffers ; that the peculiar cachectic appearance that belongs to epithelioma, makes itself manifest. The involvement of the system, in some instances follows so rapidly upon the development of the primary neoplasm, as to lead to the impression that the general disease preceded the local, but if such cases are examined care-



fully, and their previous history analyzed, it will be found otherwise.

The results of the removal of an epithelioma in its earliest recognizable stage, also speaks in favor of a local origin; for the neoplasm will not return, if the operation is performed before secondary nodules develop; and prior to the lymphatics being involved in the morbid process.

The constitutional origin of epithelioma,—all that is here said of epithelioma generally, applies to epithelioma of the mouth with equal force—, and the necessary inheritance and transmission of the neoplastic disease, are closely related theories, and must fall together.

That epithelioma, or any other peculiar and pathological histo-genesis, to which an organism has become so far accustomed, as to tolerate its existence, may be transmitted to an offspring, in the same manner in which a characteristic feature or entirely physiological distinction are given, admits of no question; but that such a genesis is essential to the development of a pathological condition, any more than it would be to a physiological condition, does not appear, from what is known of biology.

The son may resemble his ancestors' physiology, and pathology, or he may not, the determining factor in either case, being unknown. Or again, the child may present peculiarities of structure, physical or moral deformities, that cannot be traced to any progenitor.

There is no reason for excluding such phenomena from the realm of the redistribution, and rearrangement of force and matter, in which vital changes constantly have their origin. In this domain, belongs the variation that makes the individual; that makes the son, though an outgrowth of his father, differ from him.

While therefore a pathological histogenesis may be transmitted from parent to offspring, its appearance in the child, does not involve a belief in heredity, nor does it contradict, the *de novo* origin of the change.

The etiology, as well as the pathology of epithelioma will become clearer, the more our investigations are directed towards normal methods, as the prototype of abnormal methods; the closer we acknowledge to be the relationship between health and disease. We will then see that one, is the continuation of

the other ; that both processes are vital phenomena, and subject to the same laws ; that in health there is a general gradual establishing of an equilibrium between the organism and its environment ; that in disease there is in isolated parts, a premature like result, that finds its motive power in an increase or decrease, of functional activity.

*Epithelioma of the lip*, begins as a small, hard, painful nodule, situated immediately beneath the superficial layer of epithelium, at the junction of mucous membrane and skin. The neoplasm therefore has its rise in the columnar cells that cover the papillæ, or as has already been suggested, in the epithelium of the labial glands.

The primary nodule increases in size by a more or less rapid proliferation of the epithelial cells, and soon sends processes into the underlying connective tissue. As the deeper structures become involved, ulceration always takes place. At first the destruction of tissue is superficial, but the process soon spreads, and a deep, uneven, granulating excavating is developed, over which is formed a constantly renewed blackish gray scab. The edges of the ulcer are somewhat overhanging, and

present the hard, almost cartilaginous consistence, that characterizes all epitheliomatous ulcers.

The destruction caused by epithelioma of the lip, is principally in the direction of the superficial structure, or more strictly, the ulceration of both deep and superficial tissues, proceeds together.

In the earlier stages of the neoplasm, the abnormal histogenesis is confined to the epithelial tissue, but as this becomes more removed from healthy growth, the neighboring connective tissue cells are excited to proliferate, and there ensues an area of embryonal connective tissue cells, that surrounds the epithelial nodule.

Epithelioma of the lip, is not to be ranked among the rapidly developing forms of this neoplasm. Its first stages are rather slow, and are not clearly defined. The enlargement of the sub-maxillary and cervical glands, does not occur until the primary nodule has become well developed, and the diagnosis may be obscured by the superficial scab, which not being removed, prevents a knowledge of the extent of the underlying destructive ulceration.

The disease with which epithelioma of the lip, is most likely to be confounded, is the primary lesion of syphilis, the occurrence of which in the mouth, there is reason to believe is increasing in frequency in this country. The history of the case, will however generally prove sufficient for a diagnosis, when a not very well defined case is rendered more obscure, by denying the possibility of infection.

Epithelioma of the lip, is a disease of advancing life; chancre is generally found in youth.

Epithelioma of the lip, is almost confined to the lower lip; chancre is confined to no locality.

Epithelioma of the lip is usually developed in men; chancre of the lip is usually found in women.

The glands in epithelioma of the lip, are not involved until quite late in the disease; in chancre of the lip, they begin to enlarge before the second month of the disease.

The ulcer of epithelioma of the lip, has a flat bottom, with overhanging, clearly defined edges; the ulcerated chancre is more of an excoriation, and when the tissue is lost,

the excavation is funnel shaped, the edges shelving to the base of the ulcer.

The scab is a constant feature of epithelioma of the lip, and its characteristic appearance has been described ; chancre of the lip does not always form a scab, and when the process takes place, it is imperfect, the covering of the sore being thin, and easily removed.

Epithelioma of the lip, is usually attended with severe burning pain ; chancre of the lip, as in other situations, causes little, if any suffering.

The two diseases can be further differentiated by applying the test of the microscope. In one case is found the characteristic arrangement of non-vascular epithelial cells, and vascular connective tissue, the epithelial cells occupying the histological position of being the primarily effected bodies ; in the other case, epithelial tissue occupies a most subordinate position, the lesion consisting almost entirely of embryonal connective tissue, in which the vessels are large, and numerous. The microscope also shows the discharge from epithelioma to be made up of broken down epithelial cells, and the discharge from a

chancre, to consist of pus corpuscles, blood and serum.

Epithelioma of the lip, sometimes closely resembles a *lupus ulcer*, or *lupus exedens*, but the history and pathology of the two diseases are entirely dissimilar, and when examined, will be sufficient to establish a diagnosis.

Epithelioma belongs to late life ; lupus to youth, being rare after the thirty-fifth year, and most frequent about the sixteenth year.

Epithelioma of the lip is more frequent in men ; lupus is more frequent in women.

Epithelioma is rare in the upper lip ; lupus is rare in the lower lip.

The border of epithelioma has been described ; the border of lupus is not generally infiltrated, nor are the lymphatic glands enlarged.

Examination shows the corium to be the seat of lupus ; the neoplasm is therefore of connective tissue genesis, any epithelial cells that are found may be considered as quite accidental to the disease.

The ulceration that accompanies epithelioma of the lip, may be so extensive as to destroy the labial muscles ; and the patho-

logical action set up so powerful, as to produce most serious nutritive change, in the maxillary bones.

The etiology of epithelioma of the lip, is believed to include the local irritation caused by the use of a pipe. It is very true that many persons who use tobacco in this way, suffer from epithelioma, but on the other hand many do not, for the disease is very rare in the East, where both men and women smoke pipes. I am inclined to think, that if smoking has any value, considered as a cause of epithelioma, it is the heat of the pipe stem, that produces local irritation. In eastern countries, the mouth-piece used, is removed some distance from the part of the *hookah* that contains the tobacco, and does not become at all heated ; to this circumstance, we may possibly attribute the immunity from epithelioma of the lip, that is enjoyed by Orientals.

Epithelioma of the lip, however, occurs in men who do not smoke a pipe, or use tobacco in any form, this therefore can be regarded as but one of the causes of the disease ; other causes may be any irritant, that acting upon the labial glands, or mucous membrane, excites their epithelium to proliferate, or the



same result may follow a purely local over nutrition of the parts.

The average duration of life of persons suffering with epithelioma of the lip, if the disease is allowed to progress unmolested, is about eighteen months, but in no form of epithelioma, may a cure more reasonably be expected to follow operative treatment, than the one now under consideration, it must however be understood, that such favorable results can be obtained, only when the operation is performed in the early development of the neoplasm, while it is still a local cell derangement. If treatment is delayed until secondary nodules develop, and the sub-maxillary glands are participating in the morbid process, no operation of lesser magnitude than to include all the diseased tissues, will avail to arrest the progress of the malady; it is obvious that such an operation would be impracticable, therefore any treatment that may be adopted, after the infiltration of tissues has begun, must be palliative. Removal of the primary nodule may be considered advisable even at a late day, but the disease is thereby, only arrested, and one centre of infection destroyed. In a few months, or

before the cicatrice tissue has formed, the neoplasm will develop either in the neighboring glands, or at the seat of the primary tumor. There is reason to believe that considerable infiltration from the local neoplasm into the lymphatic glands, sometimes takes place before these glands show any sign of disease ; the absorbed epithelial cells remaining inactive, until conditions favorable to their proliferation obtain. It may thus occur, that after the removal of an epithelioma of the lip that was considered a local disease, the cervical glands soon develop the same morbid histogenesis ; such a result may be looked upon as proof of early cell infiltration, and may be received in favor of a timely operation.

Thus far, I have spoken entirely in favor of the knife, in the treatment of epithelioma of the lip, because I believe it to be the most certain means of curing this particular form of epithelioma, when the treatment can be commenced early in the course of the disease.

From the use of caustics, or any other treatment, applied for the purpose of destroying the neoplastic cells, I have never, in a case that I would be willing to pronounce

epithelioma, witnessed a cure. I am aware that other surgeons, whose opinion commands respect, report better results than I have seen, or obtained, from the use of such conservative methods. I may have been unfortunate in the selection of my cases.

Aside from the clinical results, I cannot but look upon the principle of treatment as unscientific, when a more rapid, and certain method exists in the knife. It is acknowledged that the disease must be removed; to accomplish this with an escharotic, requires many applications, and necessarily consumes valuable time. A constant feature of the treatment, is a certain degree of inflammation in the neoplasm and its matrix, a pathological condition, that by rendering absorption more active, is calculated to defeat the object of the treatment.

If in the surgeons judgment a part must be removed, let the operation be performed as speedily as the safety of the patient, and thoroughness, will permit; always remembering that a make-shift cannot occupy a place in the scientific surgeons equipment.

With the use of topical applications of medicinal substances, I have not had much

experience. Hydrastis, in the form of the powdered root, made into a poultice, combined with the internal use of the triturated drug, is highly recommended. Phytolacca, applied after the same method, is also well spoken of. Conium, locally and internally, has in my hands greatly relieved the pain of epithelioma of the lip, but I have come to rely chiefly on the Iodide of Calcareo, to mitigate the suffering in these cases. Antimerud, Arsenic, Clematis, Asafœtida, and Ranunc-bulb, may be found indicated. Especially the latter remedy, used locally and internally, seems to have effected some cures of labial epithelioma.

The operation for the removal of an epithelioma of the lip, is very simple.

When a general anaesthetic is used, I prefer chloroform, which if carefully administered,—the respiration should be observed, not the pulse,—need not complicate the danger of the operation. Sufficient local insensibility however can be induced, with the *Hydrochlorate Cocaine*.

An assistant compresses one side of the lip between his thumb and index finger, beyond the line of the proposed incision,

while the surgeon compresses the opposite side, for the double purpose of controlling the labial arteries, and of steadying the lip while he transfixes it below the tumor. By cutting towards the free border of the lip, the first incision is made. Entering the knife at the point of transfixion, the second incision is accomplished by again cutting towards the free border of the lip, in such a direction as to include the tumor in a V shaped mass of tissue. The knife should in no instance touch the neoplasm, but should constantly be made to cut through healthy structures.

The hemorrhage, which is sometimes quite profuse when compression of the lip is removed, is generally controlled by bringing the cut surfaces together.

Before closing the wound, it is well to wash the edges of the flaps with a solution of the chloride of zinc, to destroy any wandering infectious epithelial cells, that may remain.

For the purpose of holding the flaps in contact, I prefer to use one pin at the vermillion border of the lip, and many silver sutures in the remaining part of the wound.

Much care is required to maintain the line of the lip, and it is to better accomplish this that I introduce the single pin, over which silver wire that has been previously oiled, to facilitate its removal, is wound in the form of the figure eight.

The silver sutures should be passed through the entire thickness of the lip, and if the tension on the tissues is very great, they should be reinforced with strips of adhesive plaster.

The dressing of the wound consists of a sublimated cotton compress, and a bandage about the head and face.

At the end of the second or third day, the wound should be examined, and if possible, the sutures removed, to avoid the scars that may follow, if they are allowed to remain too long. In all cases after removing the sutures, adhesive plaster should be applied for several days, until the union seems perfectly firm.

For use during the operation, and to cleanse the sponges and hands of the surgeon and his assistants, the bichloride of mercury, 1-1000, will be found very satisfactory. It is a perfect antiseptic, and free from danger, if used in this strength.

*Epithelioma of the gums*, is at first an essentially superficial lesion. There is no tumor, and no swelling of the effected parts, until the disease is well advanced; neither does pain form a constant or marked feature of the neoplasm.

The disease begins as an apparently simple abrasion, a crack, of the investing epithelium of the gums. The initial lesion may be situated at the border of the alveolus, or where the mucous membrane is reflected upon itself at the angle formed by the floor of the mouth and the inferior maxilla, for epithelioma of the gums as a primary disease, is most frequently developed in the lower jaw.

From the slight, scarcely noticeable abrasion, there soon develops a ragged ulcer, with the characteristic indurated border of epithelioma. The ulcer, if beginning on the inner side of the gum, spreads towards the tongue, but if the abrasion has its seat on the outer side, the cheek is soon involved; more rarely, the ulcer spreads across the gum, to involve both tongue and cheek.

The destruction of tissue that begins in epithelioma of the gums, is only limited by the distribution of epithelial cells, and if not

arrested, the tongue, the palate, the pharynx, the entire epithelial lining, may become implicated, producing a vast ulcerated surface, that interferes with deglutition, and renders speech difficult, if not impossible. The almost cartilage like hardness of the floor of the ulcer, causes great stiffness of the parts, and the sharp burning pains, that increase as the disease spreads, renders life a prolonged misery.

The suffering is augmented by the quantity and fetor of the discharge, which is expectorated with such difficulty, that the patients is soon exhausted; and also by the enlargement of the salivary, and cervical lymphatic glands, which become very painful.

Histologically, it is impossible for the maxillary bone to become converted into a part of an epithelial neoplasm, for cellular substitution does not extend beyond the limits of a tissue series. Those cases of epithelioma, in which the maxillary bones, beyond the lining of the alveolar cavity become diseased, or destroyed, are instances, not of the connective tissue cells becoming epithelial cells, but first, of the invasion of



the bony structure by epithelial bodies, and second, of the inflammatory new formation of connective tissue cells, and the consequent development of embryonal bodies.

The general diagnostic features of epithelioma of the mucous membrane, will usually serve to distinguish the disease from other ulcerations of the gums, and investing epithelium of the mouth. The mature age of the patient; the hardness of the base of the ulcer; the implication of the absorbents; the characteristic pain, and the tendency of the ulcer to spread rapidly in every direction, present a picture sufficiently clear to form a diagnosis of epithelioma, but if doubt remains, the microscope will determine the nature of the disease.

A section of epithelioma, shows the characteristic epithelial and connective tissue arrangement, and that the discharge consists of broken down epithelial cells; a section of any other variety of ulceration that is likely to be confounded with epithelioma, shows an absence of epithelial tissue, and that the disease belongs to the connective tissue neoplasms.

The causes of epithelioma of the gums,

may usually be traced to some local irritation, or injury. A broken or ulcerated tooth, or an injury to the gum induced by using a stiff tooth-brush, or tooth-pick, are quite sufficient to excite a local epithelial proliferation, that may result in a neoplasm, if the parts are in the stage of degeneration, that preceeds and accompanies the development of the epithelial disease.

Epithelioma of the gums, and this is here made to include all the superficial epithelial ulcerations, that originating in the gum, involve more or less of the buccal mucous membrane, is not very amenable to medical treatment.

There are a few remedies however, that administered internally, and applied locally, —for I believe the latter emphasizes the action of a drug—, offer some hope, that the disease can be cured without the aid of the knife. Foremost among these I would place *Ranunculus bulbosus*. The provings of the drug, show a marked similarity between the pathological effects, and an ulcerating epithelioma; and while I cannot report a case of cure, I feel confident that the progress of the ulceration has been arrested, and that the

neoplastic histogenesis has been controled by its use. Equal parts of the fluid extract and glycerine, should be brushed over the ulcer daily, and the first trituration administered internally.

*Phytolacca*, has received favorable mention, for the treatment of epithelioma of the mouth.

*Galium aperinum* is also accredited with curative properties, in epithelioma of the mouth.

In one case, of most rapidly destructive epithelioma, that began near the last lower molar tooth, and spreading backwards involved the pharynx, I succeeded in arresting for a time, the destruction, by daily application of the *Chloride of Chromium*. In all these cases, the surgeon labors under the disadvantage of being consulted too late, and therefore it is impossible to say what the effect of treatment would be, if applied early in the history of the disease.

From the nature and position of the tissues attacked, after the disease has become extensive, any operation to be effective, would involve formidable mutilation. While the disease is confined to the region of the jaw,

even after the alveoli and bone are involved, a section of the maxilla, or the entire removal of the bone, may be made with the possible effect of preventing a return of the neoplasm ; but when the disease has invaded the larynx, it is questionable surgery to remove that organ. The operation may prolong life, but it is a severe procedure, and the statistics of the few cases in which it has been performed for epithelioma, are not encouraging, either in the immediate, or remote results. It is quite certain, that when epithelioma has invaded the larynx, it has also infiltrated other parts, usually the cervical lymphatics, and each one of these glands may become the center for a new development of the disease.

If therefore, epithelioma of the gum cannot be operated upon, while still the disease is local, even though the structures involved are extensive, provided they are confined to the cavity of the mouth, it is well to withhold the use of the knife, and depend upon pharmacology for a cure.

It may be possible to arrest the progress of the disease by the actual cautery, or the nitrite of silver, but I have seen only tem-

porary relief follow such applications, and have thought that the resulting reaction, had the effect of exciting the neoplastic process to fresh activity.

Unless the neoplasm is very large, and involves much of the lower jaw, it will not be necessary to incise the lower lip to effect a removal of the diseased structures. By freely dividing the mucous membrane between the gum and the lip, the growth can be easily removed, with Liston's heavy cross-cutting bone forceps. But if the diseased structures cannot be so excised, the surgeon must not hesitate to perform the more extensive operation, of removal of the jaw.

Operations about the mouth, are very likely to be complicated by blood flowing into the larynx and embarrassing respiration. To avoid this, and to do away with the use of Trendelenburg's laryngeal tampon, a rather cumbersome apparatus that does not always prove satisfactory, and the practice of performing tracheotomy as a preliminary operation, and then packing the larynx with sponges, Prof. Annandale has suggested the feasibility of allowing the patient's head to hang over the edge of the table. His

method deserves warm commendation, for not only does the dependent position of the head afford natural drainage of the mouth, but by not interfering with respiration, renders tracheotomy unnecessary. Though the tongue falls back towards the pharynx after division of the genio-glossus muscles, the epiglottis is not closed, and breathing continues to be perfectly easy.

To remove half of the lower jaw, it will be found convenient to extend the incision along the margin of the bone, from the lobe of the ear, to the median line. If necessary to further expose the bone, a vertical incision through the lip, may be made to join the first incision. After securing the facial artery, the cheek is dissected from the jaw, to an extent required by the tissue to be removed, taking care to avoid wounding the facial nerve. After extracting a tooth at the point where the bone is to be divided, the latter operation may be performed with a small straight-backed saw, or with the chain saw, which I prefer for this purpose. By now seizing the bone with the "lion-forceps," it may be drawn out, and allow room to run the knife along its inner surface, keeping

close to the bone, to avoid wounding the sub-maxillary gland and lingual nerve. After dividing the pterygoid muscle, traction on the bone will depress the coronoid process, so that the temporal muscle is easily separated from its attachment. If now the knife is passed in front of the joint, dislocation will readily be accomplished, and by cautiously cutting behind the bone, the latter may be wrenched from the face. It is important at this stage of the operation, to exercise the utmost gentleness, for the condyle and neck of the maxilla are easily forced against the internal maxillary artery, to injure which, would unnecessarily complicate the operation.

The after treatment, as well as the operation, should be conducted upon strict antiseptic principles. For this purpose, I prefer the bichloride of mercury, 1-1000. Before closing the wound, it is well, as recommended by Mr. Christopher Heath, to apply the actual cautery to the cut surface of the bone, for the purpose of removing rough pieces, and of arresting any oozing that may take place.

The drainage tubes being in position, and

their placing is a matter of the first importance, the wound should be dusted with iodoform, which has a specific action upon the healing of bone, and the flaps brought together with both deep and superficial silver sutures. Over the wound, carrying out the principle of a dry dressing, which I believe to be the true antiseptic dressing, is placed a large compress of sublimated cotton, and the whole secured with the usual head and face bandage.

Without disturbing the dressing, the mouth should be frequently cleansed with a solution of *chloride of zinc*, thirty grains, to one ounce of water; or of *permanganate of potassium*, about 1-1000.

In the place of the sublimated cotton, it may be well to dress the wound internally and externally, with iodoform gauze, as suggested and practiced by Prof. Billroth at his clinic in Vienna. His success in operations about the mucous passages, is almost phenomenal, and should stimulate other surgeons, to obtain like results with the methods he employs.

The dressing should not be disturbed, unless symptoms of inflammation develop,



before the eighth day, when the wound will be found to have so far healed, as to make removal of the sutures and drainage tubes safe.

The use of a mechanical appliance to prevent the contraction of the muscles of the remaining portion of the jaw, is probably of doubtful propriety. For it has been found almost impossible to so keep the bone in position, and the pain caused by any apparatus thus far devised, is sometimes intense, and cannot be endured. If left to natural processes, the parts will adapt themselves to their new relations, better than when art interposes, to produce certain results.

*Epithelioma of the upper gum* is rarely a primary disease, but usually secondary to the development of the neoplasm in the antrum. In this cavity, squamous epithelioma develops to an alarming extent, before its presence is suspected, or with only such swelling of the face, and illy defined pains, as may be attributed to neuralgia, or an ulcerated tooth. Indeed the trouble is frequently believed to be an ulcerated tooth, and the supposed diseased tooth extracted. The true nature of the disease is then made

evident, by the destruction of the floor of the antrum, and the subsequent protrusion of the epithelial mass through the alveolus.

Or epithelioma may be mistaken for an abscess of the antrum, and the existence of a neoplasm not diagnosed, until the antrum wall is punctured, for the evacuation of the supposed pus.

Before the conditions are present, favorable for a microscopic examination, the age of the patient is the most important factor in deciding the nature of the disease. Swelling and pain of the superior maxilla, occurring in a person over fifty years of age, would lead to a suspicion, of grave and malignant disease of the antrum.

Unfortunately the age of those suffering from epithelioma of the antrum, is opposed to the success of so grave an operation as the removal of the superior maxillary bone; but the rapidity with which the disease invades the deeper structures, places the only chance of relief, in the most active, and thorough extirpation of the neoplasm; and this means nothing less than removal of the superior maxillary bone.

The removal of the superior maxilla, is

best accomplished by following the line of incision suggested by Sir. Wm. Fergusson.

To expose the bone sufficiently for its excision, and at the same time to avoid the unsightly scar and contraction that remain after destroying the angle of the mouth, which necessarily divides the facial nerve, as proposed by Mr. John Lizars the first surgeon to demonstrate the possibility of removing the entire superior maxillary bone, Sir. Wm. Fergusson carried the incision through the median line of the lip, into the nostril, and if necessary, prolonged the incision up the side of the nose, to end in a curve under the orbit, that terminated at its outer angle. Besides the advantages of this incision, already mentioned, the extent of the mutilation may be regulated by the judgment of the surgeon, as he proceeds with the operation.

After freeing the ala, and dissecting up the tissues that form the lower flap, the incisor teeth of the bone to be removed are extracted, and the alveolus and hard palate divided with a straight narrow saw, passed through the nostril. The same instrument begins a division of the nasal process of the

superior maxilla, and the malar bone, that is completed with the bone forceps. The bone is now seized with the "lion-forceps," and separated from the palate bone, and pterygoid process. Before laying the knife aside, the infra-orbital nerve is divided, and the soft palate severed of its attachment to the bone.

After arresting hemorrhage with animal ligatures, and the actual cautery, which should always be used, and when all oozing has ceased, the parts are to be dusted with iodoform, and the flaps brought together with hare-lip pins, and silver sutures.

In adjusting the severed lip, the utmost care should be observed to maintain the line of the vermilion border. As, in the operation for hare-lip, contraction may take place, it is sometimes well to curve the border of the flap, and so lengthen the line of the incision. The same dressing and after treatment are to be used, as recommended for excision of the lower jaw. For the pain and shock that follow this operation, no remedy will be found of greater service than *Hypericum*, but to obtain the best results, it must be administered in drop doses of the tincture.

*Primary epithelioma of the palate*, is a very rare disease. The seat of the neoplasm is usually in the antrum, the floor of which being destroyed, permits the epithelial mass to occupy the palate.

When epithelioma is a primary disease in the roof of the mouth, it probably develops in the mucous glands of this region.

The first evidence of the neoplasm is a small hard tumor, situated beneath the mucous membrane, to which it seems adherent. The tumor shows the same disposition to ulcerate, that marks epithelioma in other parts of the mouth, and the ulcer presents the usual characteristics of epithelial neoplasms. The pain extends to the face and head, and the cervical glands participate in the neoplastic process.

Histologically, primary epithelioma of the palate, is probably always a mixed neoplasm, containing epithelial, and connective tissue cells. When a secondary development, it partakes of the nature of squamous epithelioma, resembling in its anatomy, epithelioma of the antrum, of which it is a part.

The medical treatment has been referred to; the surgical treatment will vary with

the origin of the disease, and the tissues involved. If the neoplasm is developed in the antrum, excision of the superior maxilla will be necessary, but if it originates in the epithelium of the palate, possibly the disease can be eradicated by removing as much of the bone as the neoplasm involves. If it is desired to remove the palate plates of the superior maxilla, and of the palate bone, the excision may be accomplished, by first extracting two of the molar teeth, through the alveol of which, access is gained to the cavity of the antrum. With a strong scalpel, the integuments covering the palate, are then incised down to the bone, in a line corresponding to the floor of the antrum.

With Liston's bone forceps, curved on the flat, or with a small bone chisel, the hard palate can then be cut through, in the line of the tegumentary incision. If the soft palate is not involved in the disease, it can be severed from the bone, and allowed to remain. The deformity resulting from this operation could be overcome by a plate adjusted to form an artificial roof to the mouth. I am not aware that this operation has before been proposed : anatomically it is correct, prac-

tically it is feasible for diseases that involve only the floor of the antrum, and hard palate. But it is rare for an epithelioma to be confined to that part of the maxilla, or to the mucous membrane of the roof of the mouth. The surgeon's efforts to arrest the disease therefore, are likely to result in failure, for it is absolutely necessary, in removing a recurrent neoplasm, to cut through perfectly healthy tissue.

Mr. Heath's suggestion, to apply the chloride of zinc paste after operating upon epithelioma, I have found to be a valuable adjunct to the treatment. The paste is to be applied on strips of lint, and all possibility of its escape into the mouth prevented, by careful packing over the lint. The paste should not be allowed to remain in the wound longer than three days. While the sloughs are separating, I have found nothing better than the permanganate of potassium solution, with which to syringe the mouth.

*Epithelioma of the tongue*, is usually a primary neoplasm, it being very rare for the disease to spread to that organ, from other parts of the buccal mucous membrane.

The initial forms do not differ from those

that mark the first stages of other varieties of squamous epithelioma ; but to these two forms, the nodule, and the abrasion or fissure, there may with propriety be added a third initial process, in which the tongue is denuded of its epithelial covering. The latter is interesting, not only because of its comparative rarity, but also because of the probability that this pathological condition, is but slightly, if at all, removed from either the sub-acute, or chronic forms of superficial glossitis. In the early stages it is impossible to distinguish a case of glossitis,—for which disease Schwimmer has suggested the name *leucoplakia*—that is to pursue a perfectly benign course, from a case that is to terminate in one of the most malignant of neoplasms.

But though these distinct initial forms are noticed, there is nothing in the ulcerated neoplasm, to indicate the particular process in which it began.

Though epithelioma may develop where ever epithelial cells exist, it attacks by preference the sides,—especially the right border—, the back, and the tip, of the tongue. It is possible that the exciting cause of the



disease, determines, to a certain degree, the seat of the neoplasm; and that the part of the tongue invaded, influences the course that the disease follows.

The age at which epithelioma of the tongue develops, agrees with the period of life that has been found favorable to the genesis of this neoplasm in other organs. Epithelioma is always a disease of decay, and hence we find that its occurrence is most frequent between the ages of forty and sixty.

It is also found, that the majority of cases occur in men; indeed if we exclude from our statistics epithelioma of the uterus and mammary gland, the male sex is shown to be more susceptible of the disease than the female sex. It does not appear that physical decay is more marked in men than in women; neither are they called upon to endure anything that corresponds to the demands upon nutrition, and physical and nervous strength, that belong to the female function of reproduction and parturition. Perhaps we are nearer an understanding of the greater frequency of epithelioma of the tongue in men than in women, when we regard some of the acquired conditions of life, and

constitutions, to which men are preponderately subject.

Foremost among the former, I place the use of stimulants, in the form of tobacco, alcohol, and highly seasoned food. As we have seen, smoking alone, cannot be considered of much importance in the etiology of epithelioma of the lip, but I am inclined to otherwise regard the habit, in relation to epithelioma of the tongue, especially when the disease is developed at its apex. Here the carbonate and acetate of ammonia, acetic and carbolic acid, that are products of the dry distillation that accompanies smoking tobacco, exert their acrid qualities, and have the effect of exciting proliferation of the epithelial cells, to protect the underlying structures; or of denuding the tongue of its epithelium.

In a lesser degree, but also contributing to the irritation of the buccal epithelium, and adding to the prolonged action of the excessive use of tobacco, are to be mentioned alcohol and highly spiced food, more frequently used by men than by women. The latter fact, may so far contribute to the baneful effect of smoking, as in a measure it

explains the immunity from epithelioma of the lips and tongue, that is enjoyed by women who so use tobacco.

Among the constitutions more frequently acquired by men than by women, that contribute to this greater frequency of epithelioma of the tongue in males, I would assign a prominent place to syphilis, especially in its secondary stage.

Any long acting irritation of the epithelium of the tongue, is capable of engendering genetic changes, that result in an abnormal proliferation of the epithelial cells. Such conditions exist in superficial secondary glossitis, in which there is no ulceration, but an erosion, caused by irritating bodies. It is not here intended to advance the opinion that syphilitic glossitis is an epithelial neoplasm, or that it can become an epithelioma, but the belief is expressed, that if to a specific glossitis, of the sclerous, not the gummatous type, are added the decay and cellular degeneration that belong to epithelioma, local conditions exist that may induce the epithelial neoplastic disease. Syphilis in itself, causes premature decay, and while it cannot be said that this is suffi-

cient to bring about such an issue, may not the natural decay of the organism, acting in connection with disease, exert an influence in that direction.

Beyond age, and sex, the etiology of epithelioma of the tongue probably includes mechanical irritants. Of these, the principal one will be found in ragged or broken teeth. The disease develops at a time of life, when the teeth are more or less unsound, and have begun to decay, leaving sharp edges and projections, which coming constantly in contact with the tongue, cause a fissure in that organ. The source of irritation continuing, an ulcer that frequently becomes epitheliomatous, develops. Of course there must be other causes than the ragged teeth, in operation, for many persons suffer with such a condition of their teeth, and do not have epithelioma of the tongue.

Epithelioma of the tongue, is one of the most certainly malignant forms under which the epithelial disease appears. My own experience does not lead me to look upon the neoplasm as rapidly destructive of life, if we include the earliest recognizable pathological lesion within the limits of the disease; but

when the characteristic epithelial neoplastic process is established, the fatal termination is not far removed; between eleven and twelve months, being the average duration of life.

A section made through epithelioma of the tongue, shows under the microscope, the same arrangement of epiblastic and mesoblastic elements, that belongs to epithelioma generally. The groups of epithelial cells are more or less dense, and the connective tissue stroma varies in consistence from embryonic tissue, to closely packed fiber cells. Processes of the epithelial structure, are seen to project into the under-lying muscles of the tongue, until finally, the disease having been allowed to follow a natural course, the whole tongue becomes involved in the neoplasm. The covering of the ulcer contains broken-down epithelial cells, cells that show their origin in their irregular shapes, and in the unimportant position occupied by the cell nucleus.

Epithelioma of the tongue that has its initial process in the *nodular form of the disease*, is first noticed as a small, sharply defined, smooth tumor, usually situated, either at the base, or on the sides of the

organ. The knot rests in apparently healthy tissue, and is covered by mucous membrane that shows no sign of the underlying neoplastic process. The nodule may remain in this condition for a variable length of time, attracting little attention save from an increasing sense of stiffness of the tongue, and an inability to articulate with accustomed ease. In this stage of epithelioma of the tongue, almost more than in any other form of epithelioma, is the purely local nature of the disease illustrated. There is nothing to indicate that the pathology has extended beyond the boundary of the nodule. The general health is excellent: the tissues in immediate contact with the neoplasm are perfectly normal, and the lymphatic glands show no sign of infection. This is what I would designate as the quiescent period of epithelioma. A period during which the epithelial cells, though already started on their pathological course, neither multiply so rapidly as to be forced beyond the boundary of the primary nodule, nor depart so far from physiological types and arrangement, as to exert a deleterious influence upon the system.

The causes that augment this pathological process are not always discoverable. They may be either, external—mechanical, or within the neoplasm, and a part of the neoplastic disease ; but being in operation, the center of the nodule breaks down. This is followed by ulceration of the integument; by such an increase of the neoplastic cells as to cause their projection in irregular masses, into the lingual tissues ; and by an early conveyance of the disease to the neighboring lymphatics. The ulceration spreads deeply, and does not long remain confined to the tongue. The edge and base of the ulcer, present the usual induration of epithelioma ; the discharge becomes profuse and extremely offensive, and the burning pain severe, and almost constant.

If this process of destruction is not arrested, the enlarged cervical glands so press upon the œsophagus, as to interfere with deglutition ; and the constant inhalation of the effete discharge may induce septic pneumonia, which in connection with marasmus, soon brings about a fatal termination.

*Epithelioma of the tongue that begins in a crack or fissure*, has its most frequent seat



at the tip or sides of the organ, and is probably almost always located accidentally, by an uneven and sharp process of a tooth, or by a wound that has resulted from masticating food.

The fissure is at first insignificant, but eventually becomes bounded by a mass of densely packed epithelial cells, arranged in groups that extend into the adjacent muscular tissue.

The subsequent course is in a great measure a repetition of the nodular form of lingual epithelioma. The fissure deepens, and becomes more widely spread ; the lymphatic glands participate in the neoplastic process, and excessive pain, and prostration, bring a welcome close to life.

*Epithelioma of the tongue, that has its origin in leucoplakia.* presents a form of neoplasm, less rapid in its course than the neoplasms that we have been studying, but not less certainly fatal, if unmolested.

Attention is first directed to a circumscribed, or general sensation of rawness of the tongue, noticeable from its persistence, more than its severity. The primary lesion is usually attributed to a scald or burn, caused by some article of food.



If the tongue is examined at this time, there are found, generally on the dorsum, one or more dark red, smooth patches, that are but little if at all, raised above the surrounding mucous membrane. Suppuration, or a discharge of any kind is not found at this stage of the disease. There is no inflammation, and there is an absence of induration of the under-lying tissues.

Without necessarily involving more superficial tissues, as the apparently simple "congestion of the epithelial layers" merges into a malignant neoplasm, the base and borders of this primary lesion become indurated; the hitherto mucous patch breaks down, and is covered with cast off epithelial cells. The lymphatic glands now show evidences of infection, and what has become an ulcerated epithelioma, is the seat of severe burning, lancinating pains.

This form of epithelioma, preserves during its whole course, certain characteristics that point to the primary lesion. It is for example, observed, that suppuration is never profuse, and is sometimes quite absent; and that the process of destruction does not involve the deeper structures, but tends to spread superficially.

If epithelioma can in any of its forms be regarded as a chronic neoplasm, the variety that we are now studying is above all others, deserving of that position in pathology. The process of destruction may gradually increase during an almost indefinite length of time, before there is to be detected either lymphatic infection, or constitutional involvement; and even often these features indicate the nature and dissemination of the neoplastic cells, the malignancy of the disease is neither as well marked, nor as rapidly developed, as has been observed in other forms of epithelioma.

A consideration of the frequency with which leucoplakia precedes the development of epithelioma of the tongue, is suggestive of an analogy between this primary lesion, and Paget's disease of the nipple, in its relation to epithelioma of the mammary gland. I cannot consider the latter disease a variety of eczema, but I am inclined to look upon it as an epithelial neoplasm, and as much the same process in the nipple, as the leucoplakia that precedes epithelioma, is in the mucous membrane of the tongue.

The diagnosis of epithelioma of the tongue, is likely to be embarrassed, principally in the

direction of secondary and tertiary lesions, of that organ.

The primary sore, and the secondary mucous papule of syphilis, can with ordinary care be eliminated from the question of diagnosis ; but not so with the late secondary infiltration, and ulceration, and the tertiary gummata.

As a general distinguishing feature of all specific lesions, it will be remembered that enlargement of the lymphatic glands takes place early in the course of the disease ; this fact, unless the question pertains to one of the more rapidly malignant forms of epithelioma, will at once suggest the nature of the neoplasm. The age of the patient, and the usual absence of pain, will also speak in favor of a venereal taint.

The superficial syphilitic lesion, may some times present an appearance that is very similar to a superficial epithelioma ; but in the floor of the former, there are frequently developed cracks and fissures, which successively heal and open, many times ; there is also a tendency for the ulceration to spread in one direction while healing in another, both of which processes, indicate a power of

recuperation, that does not belong to epithelioma.

The diagnosis between the ulcerated gummata, and an ulcerated epithelioma that originated in a nodule, is established with less ease. After duly weighing the matters of age, sex, lymphatic complication, and the condition of the surrounding tissues, the distinction will rest principally upon the appearance of the lesion.

From the bottom of an ulcerated gumma, which is usually deep, and as if scooped out, there is more or less sloughing of tissue,—a condition that does not obtain in epithelioma, the surface of which is covered only with broken down cells—, and the edges are soft, undermined, and somewhat turned in upon themselves, thus showing the base of the ulcer to be more extensive than the tegumentary lesion.

When however, any doubt exists as to the true nature of the disease, a section of the neoplasm should be subjected to a microscopic examination, which may be relied upon to confirm the diagnosis.

*Treatment.* The success of any method of treating epithelioma of the tongue, will in a

measure depend upon the particular form that the disease assumes, but will more especially be influenced by the period at which the case comes under treatment.

The medical treatment that has already been suggested for epithelioma in other parts of the mouth, may with equal propriety be repeated in this place.

Especial mention may be made in favor of *galium aperinum*, for epithelioma of the tongue ; and I would also direct attention to the *comocladia dentata*, which produces an ulcer, characterized by hard indurated edges, and covered with a foul discharge.

But while it may be possible that medicines are able to cure an epithelioma of the tongue, in view of the insidious nature of the disease, and the finally rapid development of constitutional symptoms, and secondary neoplasms, the question, how long is the surgeon justified in trusting to the action of medicine, before he removes the diseased part from the organism, becomes one of serious import.

We are here dealing with a disease, the initial process of which is local, but a disease that with characteristic rapidity pervades the entire system, and multiplies itself in remote

parts. If therefore, a case of epithelioma is subjected to treatment, while it is a local neoplasm, shall we give medicine, or shall we, without delay, remove the tumor. Modern surgeons almost unanimously speak in favor of the latter course ; but there may be obstacles in the way of its adoption. First : To make the operation thorough, it will not be sufficient to remove the nodule of disease only, the larger portion of the tongue must be amputated. The inconvenience to the patient of the loss of his tongue, needs no demonstration. There will therefore be a natural desire to preserve the tongue, and a disinclination to at once, resort to an operation ; but against the loss of the tongue, we can place the final loss of life, if the disease spreads beyond its local origin.

Then there is to be encountered the possibility of a mistaken diagnosis, before the development of those very constitutional symptoms that render the results of any method of treatment doubtful. Of course the tongue would not be amputated on the supposition that epithelioma was the disease, and we have therefore now to decide what treatment to pursue, in a case of more or less

ulcerated epithelioma, that may occur before the system suffers. It is difficult to find another answer than that just given; the uncertainty of medicine, probably arising from our ignorance, and the valuable time lost in awaiting its action on one hand; on the other hand, the certainty that life will at least be prolonged by an operation,—an analysis of 54 cases operated on, gives an average duration of life of 19 months; and an average of 49 cases not operated on, an average of 11-7 months, showing a gain for operating of 7-3 months. (*Arthur E. Baker, Holmes System of Surgery*—,) furnish support, to the more active and heroic course of treatment.

The position therefore of medicine, in the treatment of epithelioma of the tongue, seems to be limited to those cases that, either from the extent to which the tissues are involved in the neoplasm, or from some individual reason, cannot be operated on. The treatment is then palliative; happily it may be curative.

It is now quite generally conceded, that the development in the tongue of an obstinate ulcer with an indurated base, in a person over fifty years of age is sufficient to excite

grave suspicions of an epithelioma, and if no improvement follows one or two weeks of medical treatment, the neoplasm should be removed without further delay. In these cases, the question is frequently not one of a cure, for unless every neoplastic center is excised, the disease will return, but resolves itself into affording temporary relief, and prolonging life.

We are now brought to a consideration of the third principal obstacle to the excision of the tongue for epithelioma,—the mortality after the operation; but this one, like the former two, will be found to grow less formidable, when compared with the death-rate that belongs to non-interference; and when the after-treatment, is more successful in combating the results of an operation.

The mortality after amputation of the tongue has reached the high figure of twenty-six per cent. but with improved methods of meeting the principal source of danger after this operation,—septic pneumonia—, the ratio has greatly decreased, for in seventeen cases operated on at Prof. Billroth's Klinik, there did not occur a single death.



The operation is not a particularly severe one, and involves no organ that is essential to life. The loss of blood need not be more than trifling, and hence the conclusion is reached, that the results of the operation will depend upon the ease with which the lungs become infiltrated with septic matter, or irritated with the foul gases from the wound ; and this will increase with the nearness of the operation to the base of the tongue, and the perfectness with which the after treatment of the wound, overcomes these dangers.

Various methods have been proposed for excising, and amputating the tongue; for reasons already mentioned, the more extensive operation will be most frequently called for when the disease is epithelioma, and therefore will especially engage our attention in this place.

The operations for amputating the tongue, differ principally in the manner of gaining access to the mouth, and in the instruments used to divide the organ ; the selection will be made in accordance with the location of the disease, and the extent of tissue involved. The propriety however, of removing all diseased tissue, together with the lymphatic

glands at the root of the tongue, and in the floor of the mouth, whether they show evidence of disease or not, when the neoplasm is epithelioma, will also influence the plan made for each operation.

We may discard the older operation of Roux, modified by Billroth and V. Langenbeck, of gaining access to the tongue by dividing the lower jaw, as an unnecessary mutilation, excepting when the neoplasm involves the gums and bony structure,—and even then it may be questioned whether for such an extensive degeneration, any operation could be justified—, for the entire floor of the mouth can be cleaned out, and the tongue removed at its base, without injuring the bone, a grave complication of any operation, and one likely to increase the danger of septicæmia.

As the simplest operation that is consistent with thoroughness will give the best results, it is desirable if possible, to remove the tongue through the mouth, without making any preliminary incisions. This can be accomplished even when the disease is situated at the base of the tongue.

A gag, that of Westmorland is a useful

instrument, is first introduced to hold the jaws open. A strong whip-cord is then passed through the tongue, and entrusted to an assistant, with directions to draw the organ well forward, as soon as freed from its anterior attachments, which constitutes the next step in the operation. With a pair of scissors, the mucous membrane, and genio-hyoglossi muscles are then divided near the jaw, thus leaving the tongue attached only to the hyoid bone. The scissors may now be laid aside, and the twisted wire cord, which I find easier to apply than a whip cord, from the fact that it better retains any angle to which it may be bent, of a not too heavy *écraseur*, passed behind the seat of disease, where it is held by needles that have been made to transfix the tongue for that purpose, before the chain of the *écraseur* was adjusted.

If before beginning to tighten the instrument, it is found that the previous dissection of the floor of the mouth has not been sufficient to allow the chain to cut behind the diseased tissues, the tongue can be further freed, by tearing its posterior attachments with the fingers, or by the cautious use, of blunt scissors. The operation is completed,

by slowly working the *écraseur* until the tongue is cut through. In no operation about the tongue, do I find any advantage from the use of the galvanic *écraseur*. If possibly it prevents hemorrhage, this effect is more than counterbalanced, by the large and foul slough of burned tissue that remains after its use, and the danger of secondary hemorrhage, when that slough separates. Why should the attempt be made, to remove one process of cell degeneration, by establishing another process.

Without changing the instrument, if it is not desired to amputate the tongue with the *écraseur*, the operation may be continued with the scissors that accomplished the first dissection, after the method proposed by Mr. Whitehead.

This surgeon has performed successfully the brilliant operation of snipping off the tongue with scissors, without previously ligating the lingual arteries, or taking any other means, to prevent hemorrhage. He calls his operation, "the bloodless operation." While all surgeons agree upon the merits of the procedure, there is not the same unanimity of opinion as to its anatomical possibility.

The question is one of the hemorrhage that attends the operation. Mr. Whitehead says it is trifling, while other surgeons who have followed his method, say that the hemorrhage is most profuse, and only with difficulty controled. It is certainly not easy to understand why severing the lingual artery as near its origin from the external carotid, as amputation at the base of the tongue must divide it, would not be followed by such profuse hemorrhage, as to require the application of a ligature to the bleeding vessel. Until the theory of hæmostatics upon which Mr. Whitehead bases his method is more fully known, it seems probable that the "bloodless operation" will not come into general favor among surgeons.

After removing the tongue through the mouth, it may be found that the disease has spread more deeply than could before be ascertained, and that it cannot be reached by the natural orifice ; the plan first proposed by Jaeger, of dividing the cheek, can then be adopted. The incision should curve from the last molar tooth, and terminate at the angle of the mouth. It may be made on both sides of the face. Although free access to the

tongue is gained by this method, the resulting deformity from linear contraction, may, as in removal of the superior maxilla, be very considerable.

If the lymphatic at the base of the tongue, and in the floor of the mouth, together with the salivary glands, are involved in the morbid process, their removal cannot be accomplished through the mouth, either with ease, or with success. The floor of the mouth must then be opened from below, and the principal part of the operation performed through that opening.

Among many others, three infra-maxillary operations have been proposed, that will meet most of the cases that require this more elaborate operation; I refer to the methods of Prof. Kocher, Prof. Billroth, and Mr. Richard Barwell.

It will here be convenient to speak of tracheotomy, and ligation of the lingual arteries as preliminary operations in removal of the tongue, for both procedures form essential steps in the two first mentioned operations.

Opening the trachea, greatly facilitates any operation about the mouth that is likely

to be attended with hemorrhage, for it relieves the operator from the anxiety that blood is flowing into the trachea and will arrest respiration, and allows him to concentrate his attention on the operation. But I believe that in many of the simpler operations, it is an unnecessary addition to the already considerable surgical risk. Mention has already been made of Prof. Annandale's method of allowing the patient's head to hang over the edge of the table. This will be found to sufficiently drain the mouth, when the operation for removal of the tongue does not include an infra-maxillary incision, and is performed upon the anterior part of the organ.

When tracheotomy is performed before amputating the tongue, the pharynx is to be carefully packed with a soft sponge to which is attached a strong cord. The sponge should be thoroughly cleansed with a carbolic solution before it is introduced.

The ligation of the lingual arteries before amputating the tongue is a prudent step to take, when the disease is extensive, or when there is reason to believe that the walls of the vessels will not hold a ligature. With the

lingual arteries secured, the surgeon has more freedom in selecting his operation, and can use all necessary deliberation in examining the diseased tissues.

The method by which Kocher gains access to the buccal cavity, is a severe operation, but probably affords a better view of the posterior part of the tongue, and floor of the mouth, and renders the removal of the diseased structures easier, than any operation yet proposed.

Tracheotomy is first performed. An incision is then made on the anterior border of the sterno-mastoid muscle from a little below the lobe of the ear, to the hyoid bone. Here an acute angle is formed, and the incision continued upwards along the anterior belly of the digastric muscle. By turning the flap thus made upon the cheek, the lingual artery is exposed, and ligated. By this manœuvre, the attachment of the tongue, and floor of the mouth, are opened to inspection, and the removal of all the structures that are implicated in the pathological process, rendered possible. Kocher performs the entire operation under the antiseptic spray, and packs the cavity that remains,



with Listerian gauze, or a carbolized sponge. The wound is not held together with sutures, but is allowed to granulate, the discharges being received into the absorbent dressing. If drainage tubes are introduced into the angle of the wound, sufficient drainage could be maintained, at the same time that the flaps are sutured. The tracheotomy tube is not removed until the wound is well healed.

Billroth's operation is a modification of Rignoli's. He makes a curved incision that extends along the lower border of the inferior maxilla, from angle to angle of the bone. Through this opening, the tongue and diseased structures, after being freed from their anterior attachments, are drawn, and excised. But this operation, does not offer the facility for thorough work, or for removing the tongue at its base, that are given by Kocher's method.

The use of the *écraseur* through the infra-maxillary incision, possesses some advantages over the operation with the knife or scissors, that commend its adoption when the epithelioma is principally confined to the tongue.

The operation performed and practiced by

Mr. Richard Barwell, is deserving of especial consideration, from the ease with which it may be performed, and the success that has attended its use.

After placing a gag between the teeth, the tongue is controled, not drawn out of the mouth, a point insisted upon by Mr. Barwell, by means of a cord passed through the raphe. An incision about a quarter of an inch long, is made in the median line, from the hyoid bone forward, and often dividing the mylo-hyoid muscle, and separating the genio-hyoid and genio-hyoglossus muscles from their fellows, the root of the tongue is reached. With a Liston's needle, the point of which is guided to a little beyond the last molar tooth, by the forefinger placed in the mouth, a loop of thread is carried to the side of the tongue. A single thread is in the same manner carried to the other side of the tongue. The wire of an *écraseur*, is then by the last introduced thread, carried through the supra-hyoid incision, to the side of the tongue, and often passing across the posterior aspect of the organ, is made to emerge at the point of entrance, by means of the first introduced loop. After attaching the wire to the body

of the instrument, its exact position may be ascertained by passing the finger along the dorsum of the tongue. In front of the line where the tongue is to be divided, a Liston's needle should be passed, to hold the wire in place. After the base of the tongue is cut through, the tissues that still hold the anterior part of the organ, are divided by means of the *écraseur*, worked through the mouth.

Any one of these four operations for removing the tongue, give ample room to excise the healthy lymphatic glands situated in that region, but when the glands become the seat of secondary deposits, and thus the possibility increases of leaving some diseased structures in the mouth, the operation of Kocher, will be most satisfactory.

Upon the treatment after amputation of the tongue, much of the success of the operation depends. The operation should be strictly antiseptic, to which end, my experience leads me to speak in favor of the bi-chloride of mercury, 1-1000, carbolic acid being still retained for use as a spray. I have not yet seen any bad effects from the use of mercury so prepared, and I find that

wounds generally, heal more rapidly, than when cleansed with any other antiseptic.

After the operation, and when all oozing has ceased, it may be well to wash the parts with a solution of the chloride of zinc, though in many cases this is unnecessary.

Iodoform makes the best permanent dressing for operations upon malignant diseases of the mouth, that has yet been proposed. The parts should be well dusted with the dry powder, and then covered, either with the adhesive iodoform gauze of Billroth, or sublimated cotton. The external wound may be treated in the same manner.

Both the internal and external dressings should remain undisturbed, as long as the character of the discharge, and condition of the patient, render it safe to delay interference. One of the advantages of a preliminary tracheotomy, is that this very essential rest of the parts is possible, for the patient can be sustained by enemata, and respiration is carried on through the tracheal tube.

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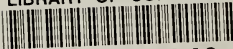








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